

WHAT IS CLAIMED IS:

1. A pharmaceutical composition for preventing or treating skin diseases, which comprises as an active ingredient either an isolated EC SOD protein or a
5 protein exhibiting substantially equivalent physiological activity to the EC SOD protein and having at least 60% sequence homology to amino acid sequence of the EC SOD protein.

2. A pharmaceutical composition for preventing or treating skin diseases,
10 which comprises as an active ingredient an expression vector comprising a polynucleotide encoding either an isolated EC SOD protein or a protein exhibiting substantially equivalent physiological activity to the EC SOD protein and having at least 60% sequence homology to amino acid sequence of the EC SOD protein.

15 3. The pharmaceutical composition of Claim 1 or 2, wherein the EC SOD protein is derived from mammals.

4. The pharmaceutical composition of Claim 3, wherein the EC SOD protein consisting of an amino acid sequence of SEQ ID NO: 11.

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5. The pharmaceutical composition of Claim 1 or 2, wherein the skin diseases are selected from the group consisting of skin cancer, pigmentation disease, photoaging, dermatitis, epidermal hyperplasia, atopy, urticaria and allergy.

25 6. A cosmetic composition for preventing or improving skin diseases, which

comprises an isolated EC SOD protein or a protein exhibiting substantially equivalent physiological activity to the EC SOD protein and having at least 60% sequence homology to amino acid sequence of the EC SOD protein.

5 7. A method for preventing or treating skin diseases, which comprises administering to a subject in need thereof an effective amount of one selected from the group consisting of an isolated EC SOD protein, a protein exhibiting substantially equivalent in physiological activity to the EC SOD protein and having at least 60% sequence homology to amino acid sequence of the EC SOD protein, and an
10 expression vector comprising a polynucleotide encoding each of the proteins.

8. Use of one selected from the group consisting of an isolated EC SOD protein, a protein exhibiting substantially equivalent physiological activity to the EC SOD protein and having at least 60% sequence homology to amino acid sequence of
15 the EC SOD protein, and an expression vector comprising a polynucleotide encoding each of the proteins, for the preparation of a pharmaceutical composition for preventing or treating skin diseases.

9. A pharmaceutical composition for preventing or treating skin diseases,
20 which comprises as an active ingredient a cell-transducing EC SOD fusion protein in which a protein transduction domain is fused to either an isolated EC SOD protein or a protein exhibiting substantially equivalent physiological activity to the EC SOD protein and having at least 60% sequence homology to amino acid sequence of the EC SOD protein.

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10. A pharmaceutical composition for preventing or treating skin diseases, which comprises as an active ingredient an expression vector comprising a polynucleotide sequence encoding a cell-transducing EC SOD fusion protein in which a protein transduction domain is fused to either an isolated EC SOD protein or a protein exhibiting substantially equivalent physiological activity to the EC SOD protein and having at least 60% sequence homology to amino acid sequence of the EC SOD protein.

11. The pharmaceutical composition of Claim 9 or 10, wherein the protein transduction domain is selected from the group consisting of a HIV-1 Tat transduction domain, an oligopeptide consisting of 5-12 arginine residues, an oligopeptide consisting of 5-12 lysine residues, a PEP-1 peptide, an ANTP protein and a VP22 protein.

12. The pharmaceutical composition of Claim 9 or 10, wherein the skin diseases are selected from the group consisting of skin cancer, pigmentation disease, photoaging, dermatitis, epidermal hyperplasia, atopy, urticaria and allergy.

13. A cosmetic composition for preventing or improving skin diseases, which comprises as an active ingredient a cell-transducing EC SOD fusion protein in which a protein transduction domain is fused to either an isolated EC SOD protein or a protein exhibiting substantially equivalent physiological activity to the EC SOD protein and having at least 60% sequence homology to amino acid sequence of the EC SOD protein.

14. A method for preventing or treating skin diseases, which comprises administering to a subject in need thereof an effective amount of one selected from the group consisting of a cell-transducing EC SOD fusion protein in which a protein transduction domain is fused to either an isolated EC SOD protein or a protein exhibiting substantially equivalent physiological activity to the EC SOD protein and having at least 60% sequence homology to amino acid sequence of the EC SOD protein, and an expression vector comprising a polynucleotide encoding each of the proteins.

15. Use of one selected from the group consisting of a cell-transducing EC SOD fusion protein in which a protein transduction domain is fused to either an isolated EC SOD protein or a protein exhibiting substantially equivalent physiological activity to the EC SOD protein and having at least 60% sequence homology to amino acid sequence of the EC SOD protein, and an expression vector comprising a polynucleotide encoding each of the proteins, for the preparation of a pharmaceutical composition for preventing or treating skin diseases.

16. A cell-transducing EC SOD fusion protein in which a protein transduction domain selected from the group consisting of a HIV-1 tat transduction domain (RKKRRQRRR), an oligopeptide consisting of 5-12 arginine residues, an oligopeptide consisting of 5-12 lysine residues, and a PEP-1 peptide (KETWWETWWTEWSQPKKKRKV), is fused to the amino terminal end of either an EC SOD protein or a protein exhibiting substantially equivalent physiological activity to the EC SOD protein and having at least 60% sequence homology to amino acid sequence of the EC SOD protein.

17. The protein of claim 16, wherein the cell-transducing EC SOD fusion protein is comprising an amino acid sequence selected from the group consisting of SEQ ID NO: 12, SEQ ID NO: 13, SEQ ID NO: 14, SEQ ID NO: 15, SEQ ID NO: 22
5 and SEQ ID NO: 23.

18. An isolated polynucleotide encoding the fusion protein of Claim 17.

19. The polynucleotide of Claim 18, which is selected from the group
10 consisting of SEQ ID NO: 16, SEQ ID NO: 17, SEQ ID NO: 18, SEQ ID NO: 19, SEQ ID NO: 24 and SEQ ID NO: 25.